What do we do if $Ax = b$ is inconsistent, i.e. b is not in the column space $C(A)$, but b is "almost" in $C(A)$ in some sense? For example, suppose that A has one column a. This means that x is actually a real number and $Ax = b$ becomes $xa = b$: is b a multiple of a? Here is a figure:
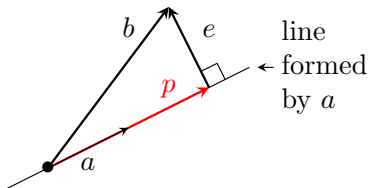
Let p be the orthogonal projection of b onto the line formed by a and let $e = b - p$ so that $\|e\|$ measures the distance between b and p. This means that $xa = p$ is a good approximation to $xa = b$, especially when $\|e\|$ is small. This leads to the topic of **projections** and **approximate solutions of linear systems**.